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BIODIVERSITY ACTION PLAN

1 BACKGROUND

Fortum’s operations including hydropower production in Sweden, Germany, and Finland, have an impact on local biodiversity. The construction of hydropower and the operation of hydropower plant alter water systems, by abstraction, impoundment and regulation of water level and flow, and therefore impact the biodiversity of the local aquatic ecosystems in particular, the fish population. However, hydropower is important in the fight against climate change, which is globally one of the greatest threats to biodiversity. Emissions from fossil fuel-based energy production may impact biodiversity at a global and local level. Increasing CO₂-free energy production mitigates the biodiversity loss caused by climate change. The construction of any facility may have impacts on biodiversity. Indirect impacts may be caused by, for example, the procurement of biomass for use as fuel or raw material, as well as the procurement of other fuels.

Fortum aims to improve biodiversity in connection with its operations. The need for measures is defined in the [Biodiversity Manual](#) applied to Fortum, but excluding Uniper. The actions shall be focused on priority areas with high biodiversity value or those with high potential for improvement. This Group-level action plan is based on measures going beyond legal or license obligations and already planned in the Generation and City Solutions Divisions and Uniper. Fortum has a Group target for biodiversity for year 2021: at least 12 major voluntary measures enhancing biodiversity.

Uniper’s most important biodiversity actions are included in this action plan for the first time. We do not include here Uniper’s projects finalised in 2020. The actions are presented by the responsible organisation in Fortum or Uniper.

Our biodiversity-related measures are connected mainly to the Sustainable Development Goals 15 and 14:



SDG 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss

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SDG 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

2 TARGETS

The main target of this action plan is to improve biodiversity in connection with the watercourses in Sweden, Germany, and Finland where we operate hydropower plants. Additionally, the action plan aims to improve terrestrial biodiversity of some individual locations near Fortum’s operations.

3 ACTIONS

Action	Location	Schedule	Cooperation partners	Status
Fortum Generation, Hydropower, Sweden				
Dam removal projects	Ejen, Stor-Druggen and Kollsjön, River Limån, Sweden	2018 - 2021		Ongoing
<p>Target: Remove migration barriers in River Limån</p> <p>Description: The Limån river system is currently dammed by 6 dams, 3 of which are owned by Fortum. The river has been identified as a potentially valuable spawning ground for the endangered Siljan trout and whitefish, as well as a potential habitat for freshwater pearl mussel. Fortum’s dams in the river also show low profitability; in 2018 work was started to produce applications for the removal of the dams. Permits were obtained in the spring of 2021 and the dams will be removed during July - October 2021. The owners of the other dams in the river have followed suit and are currently applying for permits to remove the remaining dams in Limån. This will open up the entire river system for migrating aquatic organisms. Fortum’s dam removals have been planned in close collaboration with property owners by the affected lakes and will be conducted with state-of-the-art methods without lowering water levels in the lakes.</p> <p>In Swedish: https://www.fortum.se/media/2021/03/klartecken-friare-vattenfloden-i-ejen-stor-draggen-och-kollsjon</p>				

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Action	Location	Schedule	Cooperation partners	Status
Habitat improvement of flood plains and flood forests near Untra hydropower plant	Untra HPP*, Lower River Dalälven, Sweden	2011-	Upplandstiftelsen	Planning ongoing for measures in 2021
<p>Target: Improving wetland biodiversity values</p> <p>Description: The project continues on a constant basis and consists of various measures to preserve and develop the high biodiversity values that are linked to Fortum’s land areas surrounding the Untra hydropower plant in River Dalälven. All measures that have been carried out so far and those that are planned to be carried out in the future are described in an updated nature conservation plan. In 2021, the following measures will be implemented: Spruce forest clearing in a three-hectare area. Free-cutting of old deciduous trees and clearing of spruce established in a flood forest area. Parts of wetlands must be cleared and reed-controlled in order to be able to mow later. Measures against invasive species in the area will also be implemented.</p> <p>Environmental measures in Lower Dalälven Fortum</p>				
Habitat improvements	River Klarälven, Sweden	2021	County of Värmland	Planning ongoing
<p>Target: Improvements for red-listed species</p> <p>Description: Control of invasive species (e.g. lupins). Improving habitat for red-listed species, e.g. transportation of sand, clearing vegetation. In 2020, unfortunately no measures were carried out. The County Administration Board is the initiative owner of possible actions along the river.</p>				
Habitat improvements around Fortum hydropower plants	Edsforsen, Forshult and Dejevors HPPs, River Klarälven, Sweden	2019-	County of Värmland	Ongoing
<p>Target: Improvements for red-listed species and managing invasive species</p> <p>Description: The biodiversity project was initiated by Fortum in 2018 through an inventory that identified possible biodiversity measures near eight hydropower plants in river Klarälven. Measures started to be carried out in 2019, mainly the cutting and removal of invasive species and other plants. In 2020, the work became a pilot project with One Nordic as a contracting partner. The pilot will continue during 2021. A visit to Forshult hydropower plant and surroundings took place in spring 2021 in order to determine the best actions for 2021. Experts from the County Administration Board of Värmland, One Nordic, and Fortum participated.</p>				

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Action	Location	Schedule	Cooperation partners	Status
Habitat improvement around Söräng hydropower plant	Söräng (former hydropower plant), River Ljusnan, Sweden	2021		Planning ongoing
<p>Target: Improvements for fish</p> <p>Description: A field investigation will be made by an external consultant in June 2021 to determine the potential for habitat improvements. Depending on the outcome of the field analysis, the biodiversity measures to be taken will be decided on in 2021.</p>				
Avesta hydropower plant meadow improvement	Avesta HPP, River Dalälven, Sweden	2021	Municipality of Avesta	Ongoing
<p>Target: Improvement for butterflies and meadow flowers</p> <p>Description: A controlled fire in the meadows to enhance the vegetation and insects, such as butterflies. A follow-up investigation of butterflies and meadow flowers is planned.</p>				
Improving the life cycle for the Gullspång salmon	River Gullspång, Sweden	2004-2020	Municipality, Counties	Finalised
<p>Target: Gullspång landlocked salmon</p> <p>Description: Fortum Hydro Sweden was one of the participants in the management and development work concerning the Gullspång salmon. Measures carried out over the years include a fishway, restoration of habitats, spillage, and measures to minimise hydro peaking. Various investigations and research projects have been completed and knowledge on how to protect and strengthen the stock of the threatened Gullspång salmon has been increased. In 2019, 3500m² of habitats were restored and optimised in the rapids, and the optimisation continued in 2020. A smolt migration study, a pre-feasibility study to look at actions to increase salmon habitat, and an eco-hydraulic modelling of the rapids were carried out in 2020. Also, a Gullspång salmon and trout broodstock strategy, DNA-sampling analysis, repairing the lower part of the fishway, and a completed salmon population model for the river were completed. The final report was published in spring 2021.</p> <p>In Swedish: Dags att rädda Gullspångslaxen Länsstyrelsen Västra Götaland (mynewsdesk.com) (external article)</p>				

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Biotope measures for salmon and its reproduction	Downstream Älvkarleby HPP (owned by Vattenfall), River Dalälven, Sweden	2018-2020	Vattenfall, Upplandsstiftelsen	Cancelled
<p>Target: Restoration of a possible spawning area downstream of Älvkarleby hydropower plant (owned by Vattenfall).</p> <p>Description: The lower Dalälven has been investigated in a research project to explore the possibilities for fish, mainly salmon, spawning. One part of the project has been to identify possible areas of restoration to improve habitats. In 2018, the identified river stretch was modelled and showed that possible spawning areas are considerably smaller than expected: 0.9 - 4 hectares instead of 18 hectares. The plan was to restore a smaller area in 2020, but that was not carried out.</p>				
Measures for protecting a red-listed plant <i>Carex heleonastes</i>	Laforsen HPP, River Ljusnan, Sweden	2010-2020	Botanist B. Stridh	Finalised
<p>Target: Restore habitats for <i>Carex heleonastes</i></p> <p>Description: Terrestrial habitat restoration with salix cutting below Laforsen to benefit Myrstarr and followed by an external botanic inventory.</p>				
Measures to preserve the Grundsjö char	River Ljusnan, Sweden	2006-2020	Municipality, Fishing rights organisation, County of Jämtland	Finalised
<p>Target: Preserve the Grundsjö char in lake Grundsjön</p> <p>Description: Grundsjö char conservation measures were completed in 2020 according to plan (char broodstock measures, whitefish reduction fishery, outreach project, part 1 of “dam in dam” pre-study).</p>				

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Fortum Generation, Hydropower, Finland				
Releases of young salmon and sea trout in the tributaries of the River Oulujoki	Muhos, Utajärvi, and Vaala, River Oulujoki, Finland	2005-	Municipalities of Muhos, Utajärvi and Vaala, ELY centre** of North Ostrobothnia	Yearly implementation
<p>Target: Improve migrant fish populations in the River Oulujoki by releasing fish fry to breeding grounds</p> <p>Description: In addition to power companies' legal obligations for fish stocking in the Oulujoki catchment area, about 50,000 one-year-old salmon or sea trout are stocked yearly to River Oulujoki tributaries, the Muhosjoki, Utojsjoki, and Kutujoki rivers. This fish stocking project initiated in 2005 contributes to the creation of a viable population of migrating fish in the River Oulujoki. Monitoring has proven that fish have grown well in the stocking area.</p>				
Breeding area study of migratory fish in River Oulujoki	Lower River Oulujoki, Finland	2021	Oulun Energia	Ongoing
<p>Target: Investigation of potential breeding areas in River Oulujoki</p> <p>Description: The study will examine potential breeding areas for migratory fish in River Oulujoki, and the feasibility of the study areas will be determined. Additionally, the significance of the study areas in terms of strengthening the breeding opportunities and natural cycle of migratory fish will also be reviewed. The work will begin in spring 2021, and the results are expected to be ready by the end of August 2021. Included in the seven study areas located in conjunction with the power plants are the diversion channels of Fortum's Montta, Pälli, and Nuojua power plants, and the old channel of Oulun Energia's Merikoski power plant located in the heart of the city of Oulu.</p> <p>Fortum and Oulun Energia to conduct breeding area study of migratory fish in the River Oulujoki Fortum</p>				

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Action	Location	Schedule	Cooperation partners	Status
Montta fish trap operation and development	Montta HPP, Muhos, River Oulujoki, Finland	2021-2022	Municipalities of Muhos, Utajärvi, and Vaala, ELY centre** of North Ostrobothnia	Ongoing
<p>Target: Strengthen stream fish populations in River Oulujoki</p> <p>Description: The main focus at the Montta fish trap is to trap and transport mature salmonids to the improved spawning areas in the tributaries above several dams upstream the River Oulujoki. In 2020 we transported the first salmon and trout spawning pairs to River Utosjoki, a tributary of Oulujoki. When suitable, one of the aims is to try to collect eggs from the trapped salmon to improve the quality and the genetic biodiversity of the farmed salmon population at Fortum's fish farm in Montta. The expected outcome is an improvement in the salmon stocking results. However, the collection of eggs at the trap and transport device, inaugurated in 2017, has not been successful so far, due to the low number of mature female fish returning from the sea. In 2021-22 the fish trap will be modified to improve the usability of the trap.</p> <p>In Finnish: https://www.fortum.fi/media/2021/01/montan-kalojen-ylisiirtolaitteen-jatkuva-kehittaminen-tuottaa-tulosta</p>				
Montta spawning area improvement	Montta HPP, Muhos, River Oulujoki, Finland	2021-2022	Municipality of Muhos, ELY centre** of North Ostrobothnia	Ongoing
<p>Target: Improved habitat for salmon and trout</p> <p>Description: In 2021 Fortum will conduct a study on the feasibility of constructing spawning areas for salmonids below Montta fish farm. Based on the outcome of study, the best option for the habitat will be taken.</p>				

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Action	Location	Schedule	Cooperation partners	Status
Habitat restorations in River Vuoksi	Imatra, River Vuoksi, Finland	2013-	Municipality of Imatra, ELY centre** of South-Eastern Finland	Completed/Planning ongoing
<p>Target: Strengthen stream fish populations in River Vuoksi in eastern Finland</p> <p>Description: Fish habitat improvements in the Finnish part of River Vuoksi have been planned using Fortum’s habitat modelling tool to identify locations suitable for restoration as habitats for local stream fish populations. Since the beginning of the project, improvement measures have already been carried out in eight locations near the Tainionkoski and Imatra power plants. The bottom of the river bank is being reshaped and gravel and stones are being added to make the bottom more natural and more suitable for spawning and to provide shelter for young fish. In 2020 works were carried out in the Kokkasaari island area, where a small island was re-shaped to provide more underwater habitat for the fish. In 2021 the improvements are planned to continue.</p> <p>https://www.fortum.com/about-us/our-company/our-energy-production/hydropower-renewable-and-clean-energy/kokkasaari-salmonid-habitat-restoration-river-vuoksi</p>				
Fishheart solution for upstream passage of fish at Leppikoski hydropower plant and supporting actions	Leppikoski HPP, Paltamo, River Emäjoki, Finland	2021	Fishing rights owners’ associations Paltamo I and Paltamo II	Ongoing
<p>Target: Give fish the possibility to pass the dam</p> <p>Description: Fortum’s goal is to strengthen the natural cycle of lake trout in the vicinity of the Leppikoski hydropower plant in the Oulujoki watershed, which is one of the top targets in the national fishway strategy. In 2021 Fortum will implement a hydraulic dam bypass solution, Fishheart, at the Leppikoski power plant. Fishheart is a Finnish innovation to enable fish passage over a migratory obstacle. In order for the fish passage to be useful in strengthening migratory fish stocks, habitats and breeding areas are needed for the fish to migrate to. A total of 26 hectares of potential habitats and breeding areas of lake trout can be found in the tributaries above Leppikoski. During 2021 we will improve migratory fish habitats in two stream areas above Leppikoski. In addition, we are stocking the river with juvenile lake trout.</p> <p>In Finnish: Mukana kalan vaelluksella fortum.fi</p>				

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Action	Location	Schedule	Cooperation partners	Status
Restoration of the Käkilahti-Önkköri area	Lake Oulujärvi, Kajaani, Finland	2018-2020	ELY centre** of Kainuu and Municipality of Kajaani, Fishing rights owners' association of Manamansalo-Vuolijoki	Finalised
<p>Target: Restore habitats for moor frog, dragonflies and other odonata, as well as several bird species</p> <p>Description: Eutrophication and overgrowth of the area of Önkköri in the southern part of Lake Oulujärvi had weakened the living conditions of birds, fish, and other organisms. Biodiversity-related actions of the perennial restoration project finished in 2020 consisted of various measures, such as the creation of wetlands, the removal of excess aquatic flora, and dredging and excavation to create small ponds and channels to increase the habitats of water birds. The project also included the building of footbridges, piers, and a birdwatching tower in the area. In 2020 moor frogs and lilypad whiteface -dragonflies were surveyed, and both populations are viable in the Önkköri area.</p> <p>In Finnish: Önkköriin elinympäristö- ja virkistyskäyttökunnostukset fortum.fi</p>				
Fortum City Solutions, Recycling and Waste, Sweden				
Kumla butterfly landscape	Kumla, Sweden	2020-2022	Swedish Transport Administration (Trafikverket), Swedish Environmental Protection Agency / County Administrative Board, Kumla municipality, Vattenfall	Ongoing
<p>Target: Increase biodiversity by restoring former grasslands to meadows</p> <p>Description: In Sweden, we are taking part in the project coordinated by the Kumla municipality to build a butterfly landscape in the area close to our waste treatment facility. The aim of the butterfly landscape project is to increase the biodiversity in the area and to restore former grasslands to benefit plants and insects, and butterflies in particular, which thrive in meadowland with calcareous soil. The project also aims to use the butterfly path and landscape to educate children and young people. During 2020 sandy habitats for solitary bees were created, and meadows were restored in the project. In 2021 meadow seedlings will be planted in parts of the four sand beds, made for solitary bees, and additional supplementary restoration actions will be made in some areas.</p> <p>https://www.fortum.com/media/2021/06/butterfly-landscape-kumla-sweden</p>				

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Action	Location	Schedule	Cooperation partners	Status
Fortum Generation, Hydropower/Thermal, Finland				
Landscaping an old landfill area / storage field	Old Inkoo power plant site, Finland	2021		Planning ongoing
<p>Target: Improving the ecosystems for insects</p> <p>Description: During the construction of the power plant in the 1970s, the area was a landfill for a construction site. After construction, the area was levelled and resurfaced and served as a storage field during the operation of the power plant. In connection with the demolition of the power plant, it was stated that the continued use of the landfill area is problematic due to the waste in the soil. With the permission of the municipality of Inkoo, the area was left untouched. The current project will transform the sand field into a meadow suitable for insects, especially butterflies.</p>				
Uniper, Hydropower, Sweden				
Test of a combined turbine and fishway for both ascending and descending fish	Upper Finsjö HPP, River Emån, Sweden	2022 - 2026	LIFE-connects, University of Karlstad	Projecting
<p>Target: Improved connectivity on site and possible new technology</p> <p>Description: A new combined turbine and fishway will be tested and evaluated. The fishway is a double Archimedes-screw that allows fish to pass both up- and downstream. The project focuses on the passage-efficiency for target-species. At upper Finsjö HPP there is already a nature-like fishway and a downstream solution in place that is comparable to the double-screw. The project is a part of "LIFE-connects".</p> <p>https://storymaps.arcgis.com/stories/15dbb926291a4018996c51b670269fbd</p>				
Securing of residual flow without time-lapse	Ätrafors, River Ätran, Sweden	2021 -		Ongoing
<p>Target: Protection of downstream habitats and N2000 area</p> <p>Description: An outage at Ätrafors HPP means that the minimum flow through the turbines must be replaced by a minimum flow through the dam gates, which has a delay of 20-30 minutes. In order to avoid negative impact on downstream habitats, a technical solution allowing water to pass the power plant without delay will be installed.</p>				

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Action	Location	Schedule	Cooperation partners	Status
Ecological flow in old river bed	Granö, River Mörrum, Sweden	2020 -		Ongoing
<p>Target: Habitat restoration</p> <p>Description: The old river bed at Granö has been restored. Weirs have been removed and substrate has been added. After testing and modelling different flow scenarios, a voluntary minimum flow is now in place until final verdict from the environmental court.</p>				
Evaluation of effects of dam removal at Marieberg, River Mörrum	Marieberg, River Mörrum, Sweden	2020 -	LIFE-connects, University of Karlstad	Ongoing
<p>Target: River restoration</p> <p>Description: After the dam removal in 2020, the effects on the river ecology, including fish migration, macrophytes and big-shell mussels, are now being monitored by the University of Karlstad.</p> <p>https://storymaps.arcgis.com/stories/15dbb926291a4018996c51b670269fbd</p>				
Krafttag ål (Eel program)	Rivers Göta älv, Lagan, Ätran and Motala ström, Sweden	2015-	Swedish Agency for Marine and Water Management and five hydropower companies	Yearly implementation
<p>Target: Actions for the threatened eel population</p> <p>Description: Trap and transport of silver eels will be carried out during 2021 in four Swedish rivers: Göta älv, Lagan, Ätran, and Motala ström. Migrating eels are transported from lakes to areas downstream hydropower plants. The work is performed in an industry programme, managed by Energiforsk, with participation from Fortum, Uniper, and four other hydropower companies.</p>				
Collecting and distributing elvers in River Ätran through new and modern elver traps at Ätrafors hydropower plant	Ätrafors HPP, River Ätran, Sweden	2017-		Ongoing
<p>Target: Actions for the threatened eel population</p> <p>Description: This obligation has been substituted with the import and distribution of elvers from England and France, but has been started up again voluntarily. Elvers ascending from the sea are collected and distributed above the dam in Ätrafors.</p>				

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Action	Location	Schedule	Cooperation partners	Status
Uniper, Hydropower, Germany				
Higher level of ecological flow	Powerplant Schönmühl, River Loisach, Germany	Since end of 2020	District administration Bad Toelz - Wolfratshausen	Ongoing
<p>Target: Restore habitats of river animals</p> <p>Description: After the expiration of the agreement with the district administration Bad Toelz - Wolfratshausen, in which the increase of the minimum water was regulated, Uniper voluntarily renounced to reduce the minimum water to improve the habitats of river animals.</p>				
Catch & Carry	River Main and Regnitz, Germany	Since 2009 in the winter period of every year	Local fisheries authorities	Ongoing
<p>Target: Enable the migration of eels into the Sargasso Sea</p> <p>Description: As a catadromous species, the eel is native to German rivers, such as the Main and Rhine, and migrates to the Sargasso Sea to spawn. To ensure the navigability of the Main, barrages are necessary, which are mainly used for energy production as well. These barrages block fish from downstream migration and also the eels from migrating into the Sargasso Sea.</p> <p>A specially developed Migromat detects the pre-migratory restlessness of the eels and the migration waves can be precisely determined. During this time, fishermen are ready to catch the eels as gently as possible. The eels are then collected and released into the Rhine or North Sea. This procedure is called Catch & Carry. Uniper signed the contract for Catch & Carry in 2009 and adjusted the contract to a sponsored sum of 75,000 € in 2011. Annually, about 6000kg of eels are caught and transported safely into the Rhine. The Catch & Carry operation sponsored by Uniper takes place on the Main from km 77,720 to 389,425.</p>				
Litzauer loop, provision of land	Litzauer loop, River Lech, Burggen, Germany	2021	Local water management authority Weilheim	Ongoing
<p>Target: Self-dynamic development</p> <p>Description: For the self-dynamic development of the Litzauer Schleife, Uniper transfers areas that enable the water body to re-establish habitats, such as scours, sliding and rebounding slopes, or sand and gravel banks.</p>				

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Action	Location	Schedule	Cooperation partners	Status
Litzauer loop: Improved passage to the Riesner Bach (River Lech)	Litzauer loop, River Lech, Burggen, Germany	Finalisation possibly 2021	Local water management authority Weilheim	Ongoing
<p>Target: Improvement of the connection of side arms</p> <p>Description: Improved connectivity of Riesner Bach will provide many habitats for juvenile fish. Due to dampening effects, the Riesner Bach is less influenced by surge events and therefore particularly suitable as a refuge for fish larvae.</p>				
Structural measures in the reservoir Landau	Reservoir Landau, River Isar, Germany	Planning of approval in 2020, construction process estimated for 2023	Water management authority Landau	Ongoing
<p>Target: Creation of habitats for aquatic life</p> <p>Description: Structural measures in the reservoir Landau, including the placement of gravel islands, the flattening of certain bank areas, and the partial removal of the bank reinforcement. In addition, a new side arm is to be created.</p>				
Uniper Generation, Thermal, UK				
Managing an important local nature reserve	Connahs Quay Power Station, UK	2021		Ongoing
<p>Target: Improving the ecosystems birds</p> <p>Description: Located on the River Dee Estuary (on the North Wales / North West England border) is Connah's Quay Power Station. The Dee Estuary is one of the United Kingdom's premier areas of coastal saltmarsh, providing ample migratory habitat for both wetland and shorebirds. A 56ha section of Uniper's landholding upon the west bank of the Dee is managed by the Power Station as a nature reserve in conjunction with tenants the Deeside Naturalists Society (DNS). At the west end of the reserve, Uniper have provided a large two tier hide overlooking the river to the north and east alongside close up views across a SSSI Wetland meadow area to the south of the building. Further upstream a number of coastal bunded pools have been created, featuring fluctuating water levels (according to tidal conditions) which are overlooked by an additional company supported field study centre (utilised by the local community). With this wide variety of ecological features, the reserve hosts a large spectrum of bird species (including many rare and legally protected varieties). Whilst some ecological mitigatory measures were required by the planning consent, Uniper have gone above these historical requirements to provide and long term manage a highly important asset which is integral to the local community and the longer term benefit to local biodiversity.</p>				

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*HPP = hydropower plant, **ELY centre = Centre for Economic Development, Transport and the Environment